

# Modification and Evaluation of Manual Seed Planter

Mbudai Dzugu Yohanna

Department of Mechanical Engineering, Adamawa State Polytechnic, P.M.B 2146 Yola, Adamawa State, Nigeria

**Abstracts:** *This project contains the construction of a modified seed planter, the machine is constructed to be operated manually to reduce laborious and uneconomically practice that is characterized by the local planting method. The desired revolution of the planter to plant crops, such as maize, beans and groundnut was achieved by rising the shearing bar up and when working by the time the seed are loaded into the hopper. The modified planter has the capacity of planting 300 seeds at a distance of 10.5m per 37.5sec, at drop of two seed per hole with interval of 560mm or 0.56m as compared to the initial machine of the same capacity planting 300 seeds per 60sec. The furrow opener enables the machine to open soil after the seed have been dropped into the open soil. With respect to each reciprocates force as compared to the initial design having dual droplet disc, appropriate factor of safety and tolerances were made for reliable, safe construction and operation of the machine members. All components of the planter were constructed based on some standard extractor configuration and manufacturing techniques. Relative performance test was carried out with existing standard, both in efficiency and cost via testing the efficiency of the initial planter was 72% which the modified planter is 79.2%. From all indication of testing it was confirmed that the modified planter is economically viable for optimum planting operation to peasant farmers which will be of great help to improve their services in planting*

**Keywords:** Planter, seed, maize, beans, groundnut

## 1. Introduction

Before the twentieth century, the need of people was limited, the basic need of man people) at that period were food shelter, it was hardly could anyone accept any comfortable building recast as in the present time, the ancient people where not thinking of buying, cars, building of modern hoses and other devices for better and easy life with regards to the limited need people devote their time in subsistence farming according to Zhanga I Z (1918). The earliest planting was made by hoe wood and animals hones which were used by farmers for meter the seed open the seed furrow to the proper depth deposit the seed in the furrow in an acceptable pattern anting and cultivation of crops.

The pioneer of the machine famous agriculturalist Jethro invented the first mechanized version of the seed drill in about 1701. Ever since then agro industry has never looked back and little machines to bigger equipment have been designed as the time demanded. Such machines enhanced sowing of seed in uniform row and also allowed weeding between the rows of seeding during growth and this largely led to improvement in the crop yields. The seed were stored in a hopper and delivered by tubes into furrows in the ground.

According to clande (1980) the manually operated seed planter is chosen because it is cheap are easy to be maintained by an average farmer, who is not financially buoyant. As the need r production of crop is done on large scale these days we cannot meet this demand by using of he e and stick. In order to achieve the result of this high demand on the crops production it has become necessary to increase the quantity and improve the quality of crops wasting in planting but with help of this manually seed planter farmers can now have time of their own and spend less money for labour.

In the olden days seed were scattered by hand and then harrowed, in this broad casting of the seed laborious business which is very imprecise and lead to slow distribution and also caused low productivity with waste of energy. This observation prompted us to decide on this research to construct an improved manual seed planter in order to make planting easier and affordable.

The purpose of this study is to improve on the existing construction of the manual seed planter which can be used to improve the rate of planting seed.

The objectives of this project is to improved and encourage commercial seed planting in the community (especially cereal and leguminous), to emphasize the benefits of seed planting to the farmers and To reveal the significance of planting of crop production in the community.

The machine will be designed to plant only a seed per hole but it can also plant two or three seed per hole depending on the diameter of the hole that will be made as may be demanded by the farmer. The person sowing the seed will use the manually operated seed planter which is designed to supply the maximum drops of the seed or grain during sowing period. Not much technique is attached as this process of planting Henley (1980).

## 2. Design Calculations

The maximum power applied by human beings on the handle is 1/10 horse power, but 1 horse power = 750watts.

Therefore, maximum power applied by man on the handle is 1/10 x 750=75watts Since the maximum power apply by human being is = 75kg

Therefore 75 x 10= 750N

$$\text{Power, } P = \frac{2\pi NT}{60} \quad (1)$$

**The Shaft**

$$\omega = \frac{2\pi N}{60} \tag{2}$$

Then T= Torque that the shaft can transmit power that the shaft can transmit

N= revolution of the shaft

P=WT

Therefore, by making T the subject of the formula: we have

T = 82.32Nm

- 2) Strength
- 3) Durability
- 4) Availability
- 5) Weight
- 6) Appearance
- 7) Toughness
- 8) Machinability

**The Opener**

To find the stress on the opener and the force to open the soil,

Stress

$$\delta = \frac{P}{A} \tag{3}$$

Since the maximum force applied by man on the is 412N.

Where P = force needed to open the soil and

A = Cross sectional area.

$\delta$  = stress on the opener

Cross sectional area is determined by  $\pi d^2/4$

A=3.1416x32/4

Therefore, A = 28.2743 4

Then A= 7.0686m<sup>2</sup>

A = 7.1m<sup>2</sup>

Stress  $\delta$  = 750/7.1

= 105.6N/m<sup>2</sup>

In the construction of an improve seed planter, mild steel is chosen as the best material because it is widely available, reliable and low cost, it is also having the ability to resist corrosion attack in an environment where it will be used.

Material used in engineering may be classified into:

- 1) Ferrous metal
- 2) Non-ferrous metal
- 3) Plastic
- 4) Ceramic
- 5) Wood

**3.6 Design Specification**

**Table 1**

S/NO	Component	Dimention	Material
1	Hopper	100x300	Sheet metal
2	Sprocket	135	plywood
3	Seed tube	750	Mild steel
4	Sliding bar	80x20	Mild steel
5	Furrow opener	40x20	Mild steel
6	Metering device	40x10	Mild steel
	Flexible connecting rod	10x310	Mild steel
N	Seed stopper	20x40	Mild steel
q	Based plate	110	Mild steel
10	Covering device	20x20	Mild steel
11	Handle	120x1000	Mild steel
12	Glass	20x100	Plastic

**The Sprocket**

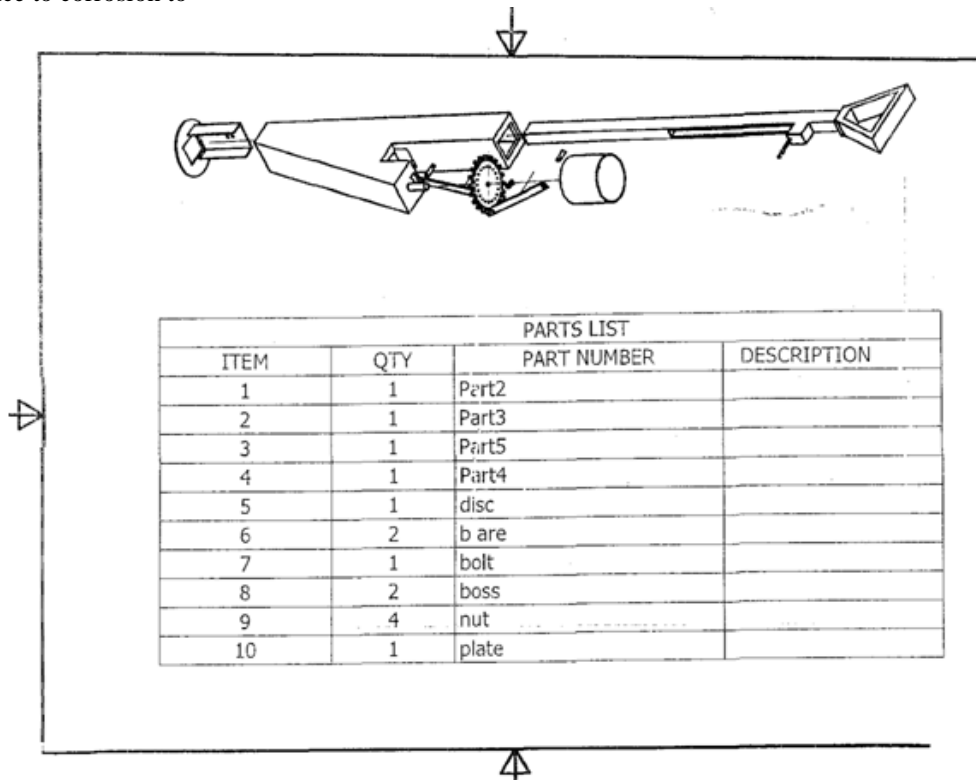
Given that the pitch of the sprocket = 6mm

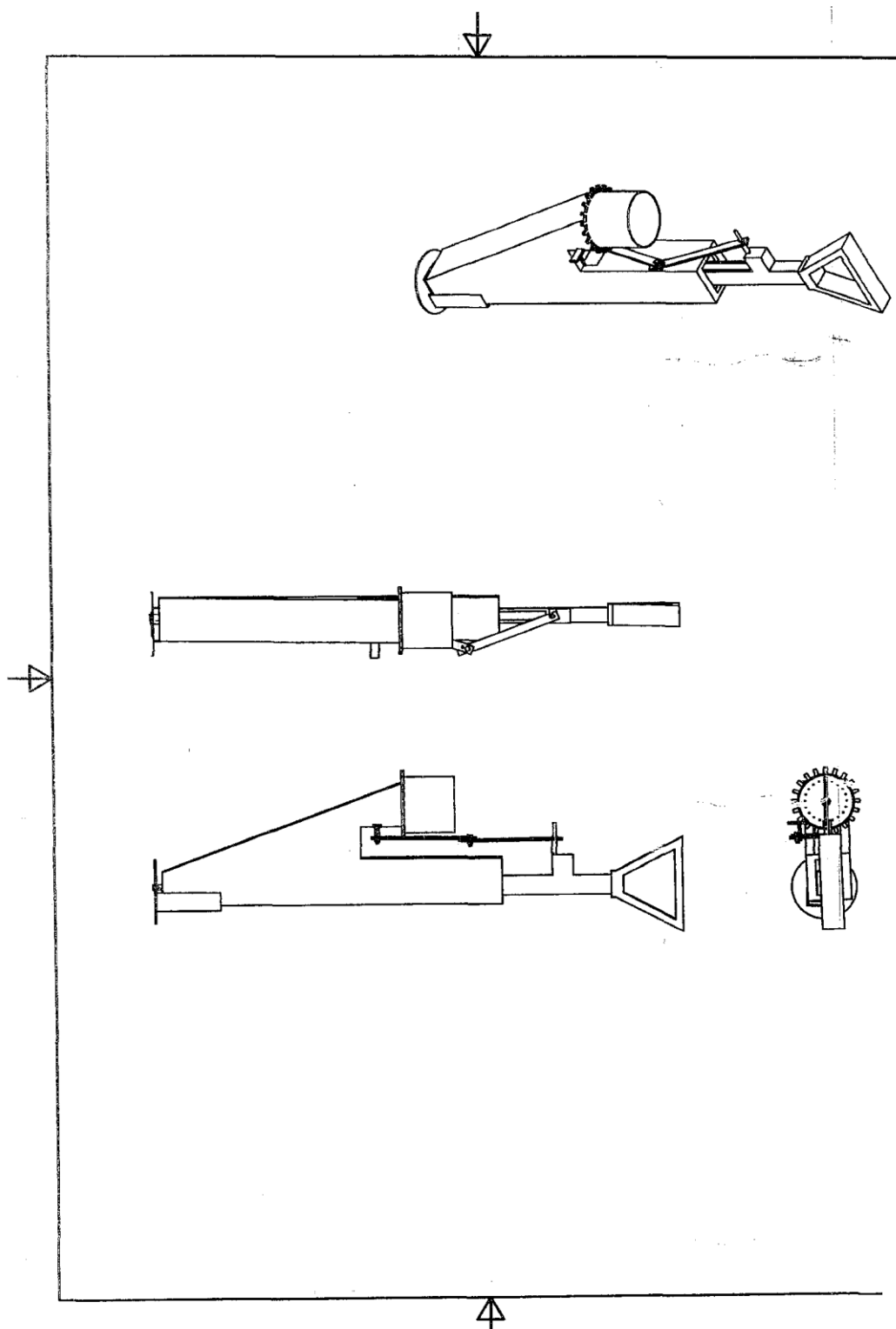
NP = pitch of the sprocket = 6mm

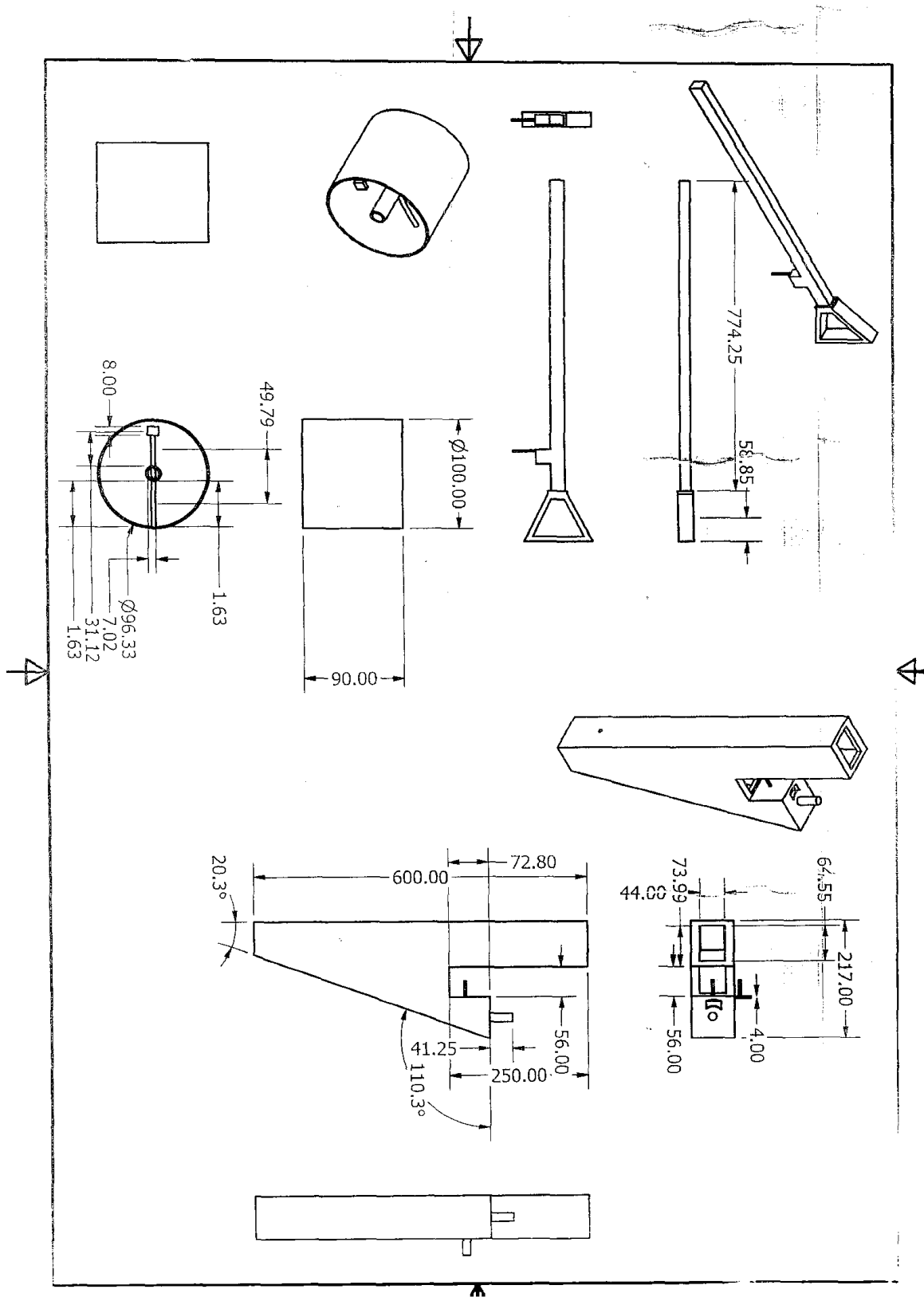
**Component Selection**

In the selecting materials for this project, consideration is given base on its suitability as well as the mechanical and chemical properties such as:

- 1) Good resistance to corrosion to









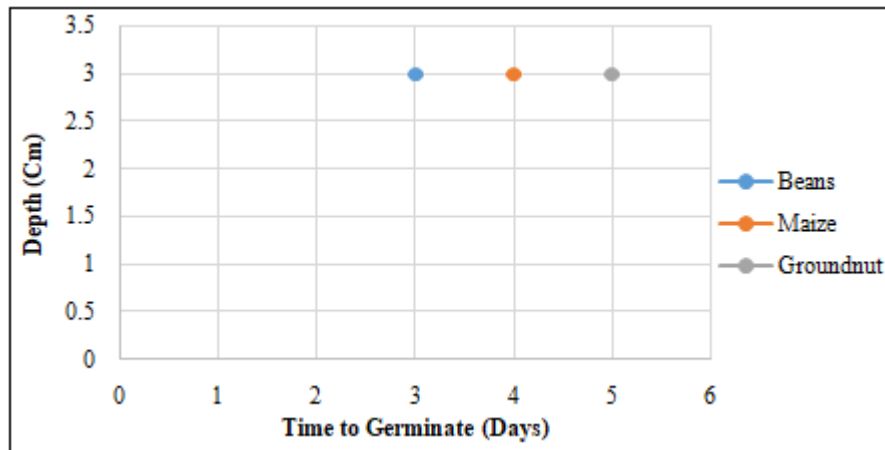


Figure 1: Variation of germination time against depth

### 3. Discussion

From fig.1 above, the depth for the seed planter is set at 3cm for all the specimen seeds. It was observed that there is a significant variation in germination time. It took 3 days for beans to start germinating, 4 days for maize to germinate and 5 days for groundnut to germinate.

### 4. Conclusion

It has been the objective of this project that the construction of an improved manually operated seed planter for planting of cereal crops, which are affordable by an average Nigerian farmer. This is based on the utilization of the local and available materials.

During the construction, the project has exposed us to logical thinking and application of theory and methodology to problem solving, to meet up the requirements for the construction. However, the problems and challenges we faced during the construction of this project has really assisted us to broaden our knowledge and has also widened our scope in the field of construction, generally this project has been successfully constructed and has been tested accordingly.

Based on the work of the manually operated seed planter, one can conclude that:

- 1) It is a planter that one can operate easily.
- 2) Its materials are relatively cheap and affordable.
- 3) It is durable to the test of time,
- 4) The improvements made on the project were;
  - a) The length of the main frame
  - b) The diameter of the sprocket based on the sizes of seeds required.
  - c) The thickness of the plate used was also very important in this construction.

### References

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